



FNAC: A Diagnostic Tool in Head and Neck Lesions - Study of 204 Cases

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Abstract

FNAC is a simple, quick, age old procedure. It is safe technique with minimal trauma and complications. In the present study 207 cases are analysed in the two years period. In this study lymph node aspirates more common followed by the thyroid lesions. By this study clinicians can plan their treatment appropriately.

Keywords: head and neck, swellings, FNAC.

Introduction

FNAC is a most commonly encountered technique by clinicians. Fine needle cytology is a simple, rapid, reliable, accurate, economical and widely established procedure. The procedure carries minimal complications and unease to patients. It is one of the most valuable tests available to diagnose a variety of head and neck lesions which are easily accessible. First used this technique in 1847. Martin in 1930 introduced this procedure to evaluate the head and neck swellings¹.

Swellings in the neck may be due to various causes. For convenience they can be divided into midline swellings and lateral swellings. More common midline swellings from above down are submental lymph nodes, thyroid gland enlargement, thyroglossal cyst, dermoid cyst and lipoma. Lateral swellings are due to enlargement of lymph nodes, salivary gland, thyroid, branchial

cyst and lipoma. In addition sebaceous cyst, hemangioma, neurofibroma can occur anywhere in the neck²

Among head and neck swellings commonest are lymph node lesions, majority of swellings are benign in nature. In cystic swellings FNAC is both diagnostic and therapeutic. Cysts can be evacuated completely. In this study we evaluated the distribution of swellings in head and neck in our hospital.

Materials and Methods

In the present study undertaken at GIMSR hospital Visakhapatnam where 207 FNAC were performed in head and neck region from March 2016 to March 2018, a two year period and brief clinical history was in each case. In suspected tuberculosis cases history of evening rise of temperature, history of weight loss are taken.

Patients were explained regarding the procedure and informed consent is taken. The patient was given a comfortable sitting or lying down position as required in the case. The procedure was performed in out- patient department by using 23G aspiration needle with syringe under strict aseptic precautions. The palpable swelling was fixed by one hand and aspirated by using 5ml syringe needle with the other hand. A firm pressure is applied at the site of puncture to avoid hematoma formation or bleeding. There were no procedural complications in any of these patients. A minimum of two passes are made. Slides were prepared and fixed in 95% ethyl alcohol, then stained with H&E and pap. In case of cystic lesions the fluid is aspirated completely and sediment smears are prepared, if any solid component is noticed in the cystic lesion then it is again aspirated. 3 FNAs were unsuccessful with inadequate material and are excluded from the

study. For thyroid lesions non aspiration technique is used as it is highly vascular to avoid more blood contamination.

Percentages are calculated for estimating the frequency of the lesions.

Histopathological correlation is done in 51 available specimens.

Results

The present study of 204 cases included patients from 1 to 80 years in which 37% were males and 63% were females. Peak incidence of the lesions was between 21 to 30 years (Table1). Over all lymph node lesions were 52% followed by thyroid lesions (35%), salivary gland lesions (9%) and soft tissue lesions(4%)(Table2). Out of 204 cases 113 cases were inflammatory, 72 cases were benign and 19 cases were malignant in nature (Table2)

Table 1 Age Wise and Sex wise Distribution of Patients

Age	Lymph Node		Thyroid		Salivary Gland		Soft Tissue	
	Male	Female	Male	Female	Male	Female	Male	Female
0-10	12	04	-	-	-	-	1	-
11-20	14	11	3	7	1	-	-	-
21-30	09	23	1	17	3	1	1	1
31-40	07	08	1	19	3	3	2	-
41-50	01	05	2	11	2	2	-	1
51-60	04	03	1	8	2	1	1	-
61-70	03	02	-	1	-	-	1	-
71-80	01	-	-	-	-	-	-	-
Total	51	56	8	63	11	7	6	2

Table 2 Distribution of Inflammatory and Neoplastic Lesions

Organs Involved	Inflammatory	Benign	Malignant	Total	%
Lymph Node	90	-	17	107	52.45
Thyroid	16	54	01	71	34.80
Salivary Gland	07	10	01	18	8.82
Soft Tissue	-	08	-	08	3.93
Total	113	72	19	204	100

Table 3 Distribution of various Lymph Node Lesions

Lymph Node Lesions	Number	Percentage
Reactive Lymphadenitis	65	60.74
Tuberculosis	23	21.48
Fungal Granuloma	01	0.95
Metastatic	17	15.88
Lymphoma	01	0.95

Among 107 lymph node swellings 51 were males and 56 were females (Table 3).

Reactive lymphadenitis was the commonest lesion with 65 cases (60.74%) followed by 23 cases of tuberculous lymphadenitis (21.48%) and 17 metastatic deposits in lymph nodes. One case of fungal granuloma and one lymphoma were reported.

All the reactive lymph nodes revealed polymorphous population of lymphocytes with

predominance of small mature lymphocytes, few centocytes and immunoblasts are seen.

Out of 23 cases of Tuberculosis 8 cases showed granulomas (IMAGE 1) with caseous necrosis, 12 only granulomas without necrosis and 3 only caseous necrosis. All these cases were proved to be kochs disease by CB-NAAT

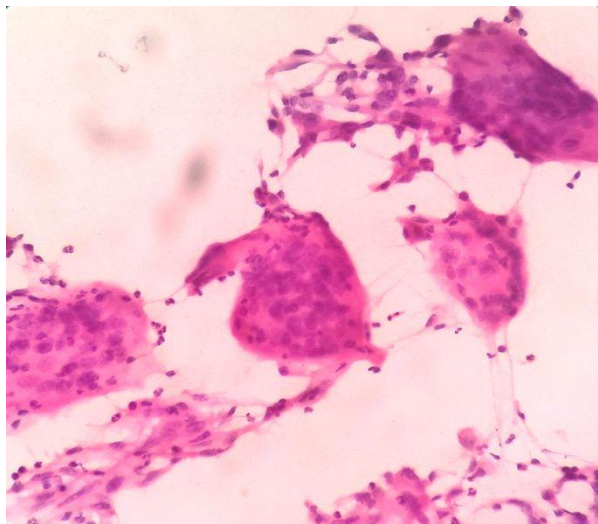


Image 1 Tuberculous Lymphadenitis

Among the 17 metastatic deposits in lymph node 16 were from squamous cell carcinoma one was papillary carcinoma of thyroid. Squamous cell carcinoma deposits (Image 2) revealed tumour cells with pleomorphic hyperchromatic nuclei orangeophilic cytoplasm in dyscohesive sheets and singles. polygonal and tadpole cells are also seen on lymphoid background.

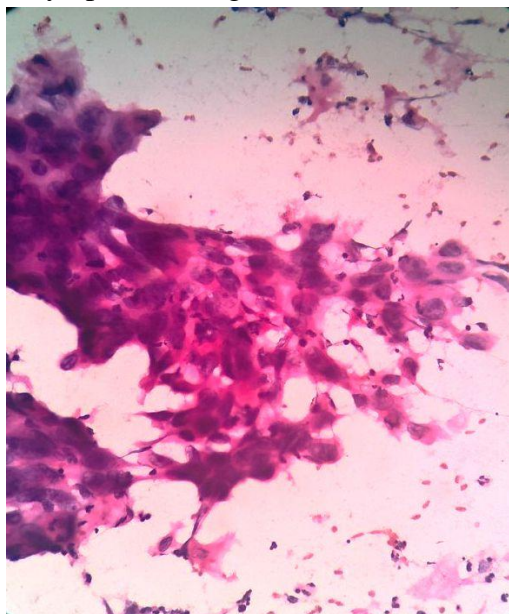


Image 2 Squamous Cell Carcinoma Deposit

Table 4 Distribution of Thyroid Lesions

Thyroid Lesions	Number	Percentage
Nodular Goitre	45	63.38
Thyroiditis	16	22.52
Follicular Neoplasm	06	8.4
Hurthle Cell Neoplasm	01	1.4
Papillary Carcinoma	01	1.4
Thyroglossal Cyst	02	2.8
Total	71	100

Patient with thyroid swelling comprised of 8 males and 63 females with their ages between 12 to 64 years. Male: Female ratio is 1:7.8. In females peak incidence of age is 31-40 years. The commonest lesion encountered in thyroid gland was nodular goiter followed by hashimotos thyroiditis. Among malignant lesions one papillary carcinoma was noted by FNAC and proved by histopathology (Image 3). The smears were hypercellular with syncytial clusters of acinar epithelial cells in papillary pattern with distinct anatomical pattern, nuclear overlapping, nuclear crowding are seen. Some of the cells show intranuclear inclusions on a scanty thick colloid background (Image 4).

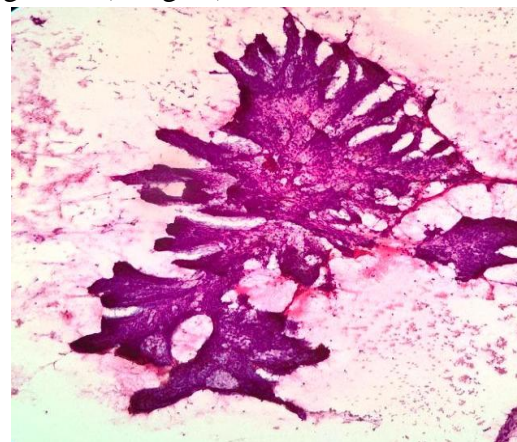


Image 3 FNA

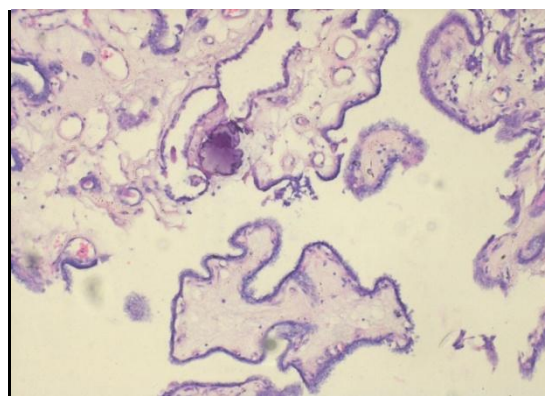


Image 4 Papillary Carcinoma of Thyroid

Hashimoto's thyroiditis smears revealed sheets of Askanazy cells and lymphocytes, multi nucleated giant cells and epithelioid histiocytes were seen. Colloid is scanty.

6 follicular neoplasms (Image 5) revealed high cellularity with clusters of acinar cells in repetitive follicle formation on a scanty colloid background. One hurthle cell tumour show rich cellularity with sheets of hurthle cells with abundant granular cytoplasm. All the follicular neoplasms were proved to be follicular adenomas and hurthle cell tumour was hurthle cell adenoma by histopathology. Two cases of thyroglossal cyst were noted, the swelling moved with protrusion of tongue and yellow coloured fluid was aspirated. Sediment smears revealed sheets of polygonal cells with round uniform nuclei on a thin colloid background.

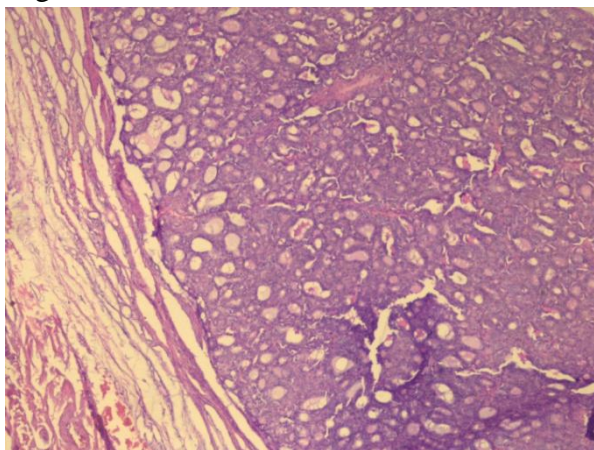


Image 5 Follicular Adenoma of thyroid

Table 5 Distribution of Salivary Gland Lesions

Salivary Gland Lesions	Number	Percentage
Sialadenitis	5	27.77
Pleomorphic Adenoma	8	44.44
Warthins Tumour	2	11.11
Mucoepidermoid Carcinoma	1	5.57
Sialadenosis	2	11.11
Total	18	100

Out of 18 Salivary gland lesions most common lesion was pleomorphic adenomas(8 cases) followed by 5 chronic sialadenitis, 2 cases were diagnosed as warthins tumour 2 were sialadenosis and I mucoepidermoid carcinoma.

All the pleomorphic adenomas showed cohesive clusters of epithelial cells with uniform oval

nuclei bland chromatin, some are plasmacytoid on a chondromyxoid background (Image 6)

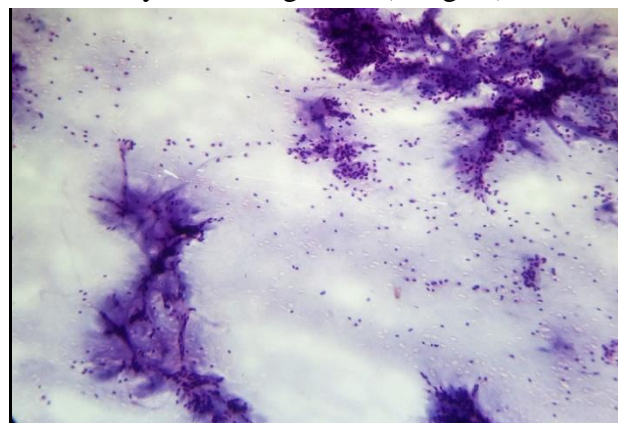


Image 6 FNA

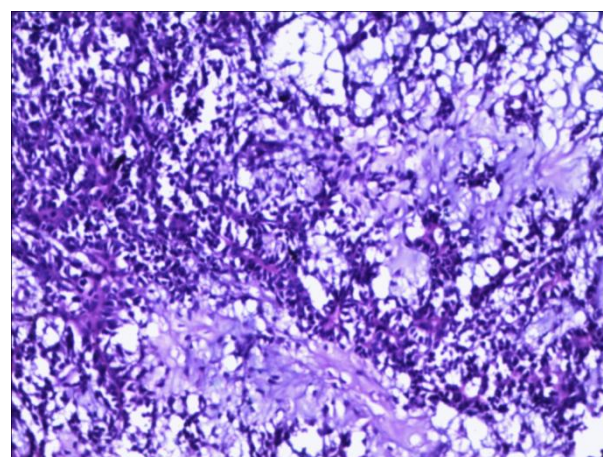


Image 7 Pleomorphic Adenoma

Chronic sialadenitis cases revealed very few sheets of atrophied acinar cells few fragments of fibrous stroma and occasional lymphocytes (Image 8)

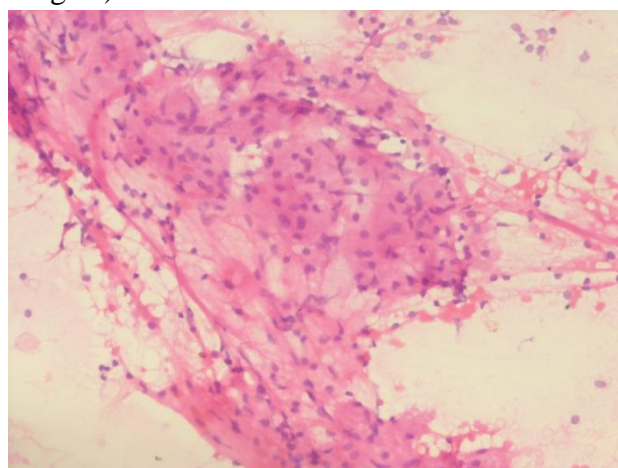


Image 8 Chronic Sialadenitis

Warthins tumour smears show mostly amorphous and granular debris with macrophages and

occasional monolayered sheets of bland oncocytic cells. It was diagnosed as cystic neoplasm by fna. Histopathology revealed cystic warthins tumour (Image 9 & 10)

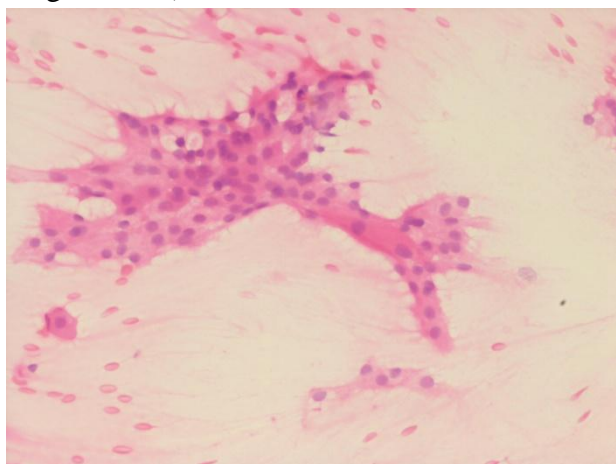


Image 9 FNA

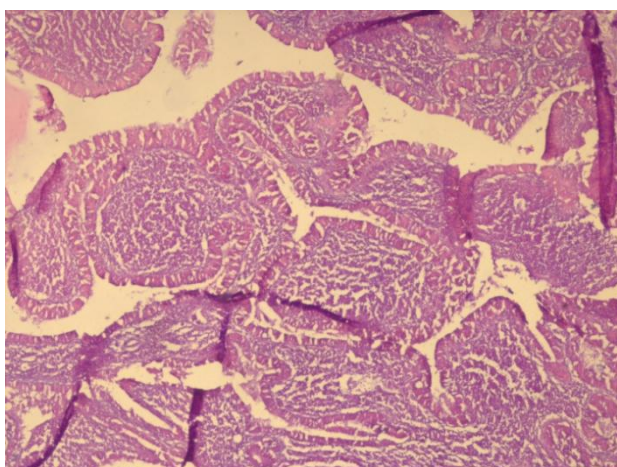


Image 10 Warthins Tumour

One case of mucoepidermoid carcinoma was correctly diagnosed by fna. Smears revealed mostly mucin and dirty necrotic debris with cohesive clusters and sheets of epithelial cells in pools of mucin (Image 11)

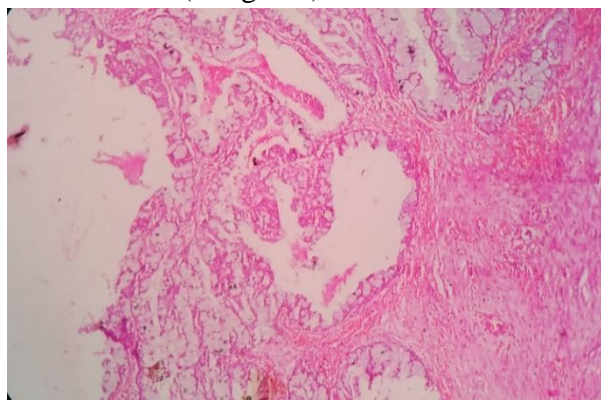


Image 11 Mucoepidermoid Carcinoma

Table 6 Distribution of Soft Tissue Lesions

Soft Tissue Lesions	Number	Percentage
Lipoma	4	50
Hemangioma	2	25
Spindle Cell Tumour	1	12.5
Cystic Lesion	1	12.5
Total	8	100

Among patients with soft tissue lesions 6 were males and 2 were females with ages ranging from 5 to 61 years.

Lipoma is the commonest soft tissue lesion encountered (50%) followed by hemangioma (25%) cystic lesion (12.5%) and spindle cell neoplasm (12.5%)

In cystic lesion sediment smears from the aspirated fluid revealed very few small mature lymphocytes. On biopsy it was found to be cystic hygroma (Image 12)

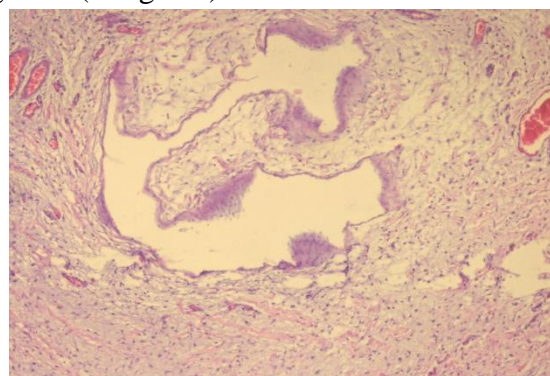


Image 12 Cystic Hygroma

One case diagnosed as spindle cell neoplasm was found to be schwannoma (Image 13). on reviewing the cytology slides showed cohesive clusters of spindle cells with long slender nucleus pointed ends and fibrillary appearance of intercellular stroma.

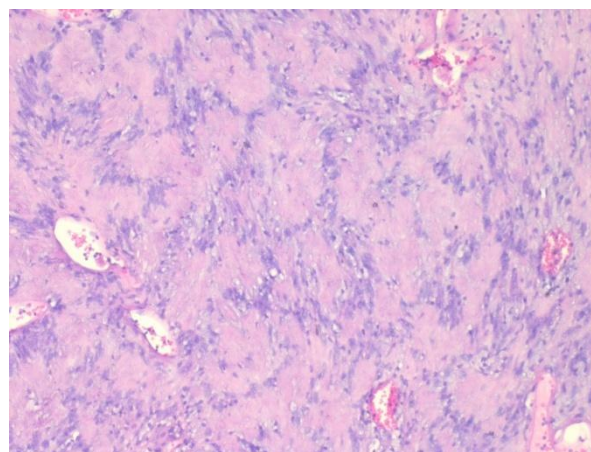


Image 13 Schwannoma

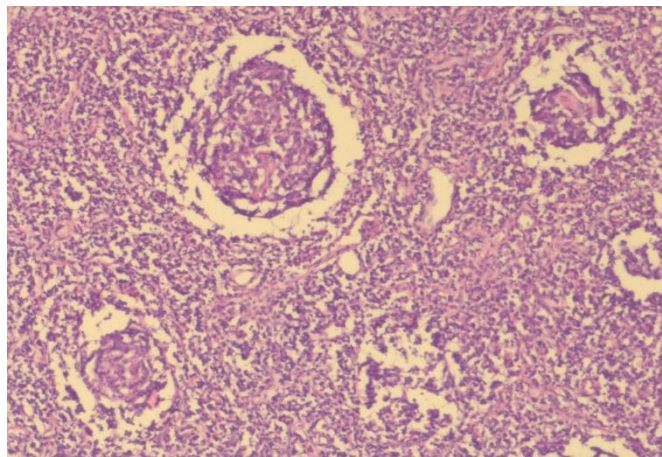


Image 14 Castleman's Disease

Table 7 Inconsistency between Cytology and Histopathology

Site of Lesion	Cytological Diagnosis	Histopathological Diagnosis
Lymph Node	Reactive Lymphadenitis	Castleman's Disease
Lymph Node	Reactive Lymphadenitis	Tuberculous Lymphadenitis
Thyroid	Nodular Goitre With Cystic Change	Follicular Neoplasm With Cystic Change
Soft Tissue	Spindle Cell Neoplasm	Schwannoma
Soft Tissue	Low Cellularity	Chondroid Syringoma

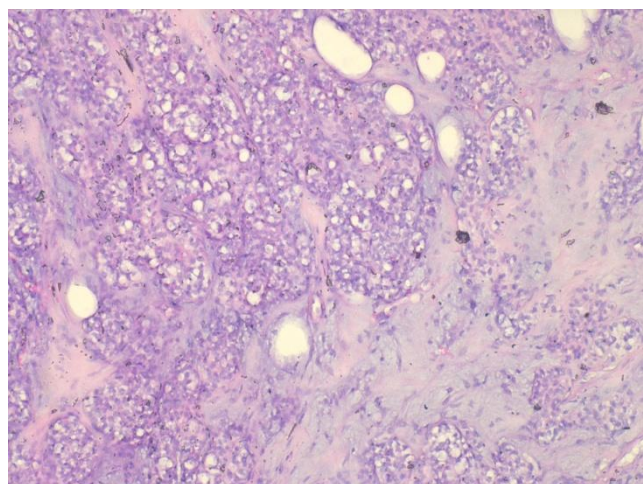


Image 15 Chondroid Syringoma

Discussion

In the present study higher number of lesions were found in females (63.24%) than in males (36.76%). These findings were similar to the study by Fernandes H et al.³ and Vijay Tilak, et al⁴ while studies by Setal Chauhan, et al⁵ found that there were more lesions males than females.

Lymph node involvement was common than other lesion accounting for 52.45% which was similar to the findings by Setal Chauhan, et al⁵ while study by Fernandes Het, et Vijay, et al⁴ found that thyroid lesions were more common 56.45% and 43.63% respectively.

Reactive Lymphadenitis was the commonest diagnosis (60.74%) followed by tuberculous lymphadenitis (21.49%) and malignancy was found in 15.88% of cases. El Hag, et al⁶ carried out a similar study in Saudi Arabia over a period of 5 years which included 225 patients which showed reactive lymphadenitis to be the commonest cause of neck masses accounting for 33% of cases. Tuberculous lymphadenitis found to be the next most common pathology constituting 21% of cases followed by malignant swellings found in 13% of cases, while other studies by Rathod GB, et al⁷ and Tariq, et al⁸ found that tuberculous lymphadenitis was found to be the most common pathology of lymph node lesions accounting for 42.12% and 36% of cases respectively followed by reactive/non-specific lymphadenitis constituting 18% and 19.3 % of cases and metastatic carcinoma found in 14% and 21.5% of cases. This shows epidemiological variation between developed and developing countries. Tuberculosis is more common in developing countries while malignancies are more common in developed countries.

Among thyroid lesions one cytologically diagnosed nodular goiter proved to be follicular neoplasm after it was studied histopathologically. It could be due to non representative sample. Gagneten stressed the importance of doing multiple aspirations in thyroid swelling in order to obtain representative samples⁹.

The diagnostic errors were most commonly due to inadequate specimens and cystic lesions. One must be careful in committing a false negative diagnostic error in cystic lesions that contain macrophages and scanty material, since these features do not exclude malignancy. Repeat FNAC or thyroidectomy is advised for persistent nodules^{10,11}. Cystic thyroid lesions pose di-

agnostic difficulties. Cystic change and/or haemorrhage in neoplasms is seen in upto 25% of primary Papillary carcinomas, in 20% of Follicular neoplasms and in 26% of Follicular carcinomas⁹. Recurrent cysts, incompletely decompressed lesions, lesions greater than 3-4 cm in diameter in which aspiration of several areas does not give good evidence of the colloid nodule and lesions in young males, have all been recommended as indications for surgical excision. Intranuclear cytoplasmic inclusions and psammoma bodies detected in up to 83% and 24% of cases of Papillary thyroid carcinoma¹², were seen in only one case in the present study.

Fnac cannot replace histopathology in the diagnosis of follicular neoplasms as it is necessary to demonstrate capsular and vascular invasion to establish malignancy in follicular and hurthle cell neoplasms.

Out of 18 fnac salivary gland lesions 11 cases are available for histopathology correlation and all the cases were consistent. Fernandes et al also noted diagnostic accuracy of 100% in their study³. The majority of the cysts occurring in the major salivary gland are associated with neoplasms. Warthins tumour and low grade mucoepidermoid carcinoma are the commonest. If the lesion doesn't disappear after aspiration it is a neoplastic cyst.

Pleomorphic adenoma (44%) was the commonest lesion among salivary glands in our study. Studies done by Rathod GB et al⁷ and Setan chauhan et al⁵ also found that pleomorphic adenoma was the commonest of the salivary gland neoplasms.

Mucoepidermoid carcinoma was found in 5.5% of the cases while studies by Solanki Piyush K et al¹³ found in 10% and Cohn MB et al reported as 35%. Sometimes false positive diagnosis of fna can be due to regenerative epithelial hyperplasia and squamous metaplasia in sialadenitis while false negative diagnosis can be due to faulty technique, central cystic change, hemorrhagic or necrotic areas devoid of diagnostic cells

Accurate typing and grading of soft tissue tumours is not possible in many cases by fnac alone,

almost all studies in soft tissue tumours have reported this limitation¹⁴.

Conclusion

It was concluded from the present study, that reactive lymphadenitis is the commonest lesion in patients presenting with neck swellings in our study, followed by tuberculous lymphadenitis and malignant neoplasms.

Thus Fnac can be recommended as the first line of investigation in the diagnosis of head and neck lesions. A persistent lymphadenopathy raises more concern especially the enlarged lymph nodes within the posterior triangle or supraclavicular region nodes, that are firm, fixed and painless or a single dominant node that persists for more than 6 months should all heighten the concern for malignancy.

Fnac minimizes the physical trauma and emotional stress to the patient and saves the expenditure of hospitalization. It helps to select and modify surgical planning in patients requiring surgery. The results confirmed that fnac is a reliable diagnostic modality for the study of head and neck lesions.

References

1. Martin H, Ellis EB. Biopsy of needle puncture and aspiration. Ann Surg 1930;92:169-81.
2. The neck in, Das S. A concise textbook of surgery, 3rd edition. Calcutta 2001; 617-41.
3. Fernandes H, et al. Role of fine needle aspiration cytology in palpable Head & neck masses. Journal of clinical and diagnostic research, 2009; 1719-1725.
4. Vijay Tilak, A.V Dhaded, Ragini Jain. Fine Needle Aspiration Cytology of head and neck masses. Indian journal of Pathol. Microbiol., 2002; 45(1): 23-30.
5. Chauhan Setal, Dharmendra Rathod, D. S. Joshi. FNAC of Swellings of Head and Neck Region. Indian Journal of Applied Basic Medical Sciences, 2011; 13: 1-6.

6. El Hag IA, Chiedozi LC, al Reyees FA, Kollur SM. Fine needle aspiration cytology of head and Neck masses. Seven years' experience in a secondary care hospital. *Acta Cytol.*, 2003; 47: 387-92.
7. Rathod GB, Parmar P. Fine Needle Aspiration Cytology of Swellings of Head and Neck Region. *Indian Journal of Medical Sciences*, 2012; 66(3): 49-54.
8. Tariq Ahmad, Mohammad Naeem, Siddique Ahmad, Ambreen Samad, Amir Nasir. Fine Needle Aspiration Cytology(FNAC) and Neck Swellings in The Surgical Outpatient. *J Ayub Med Coll Abbottabad*, 2008; 20(3): 30-32.
9. Tilak V, Dhaded AV, Jain R. Fine needle aspira-tion cytology of head and neck masses. *Indian J Pathol Microbiol* 2002; 45(1): 23-30
10. Hsu C, Boey J, Diagnostic pitfalls in the needle aspiration of thyroid nodules. A study of 555 cases in Chinese patients. *Acta Cytol* 1987; 31(6): 699-703.
11. Goellner JR, Gharib H, Grant CS, Johnson DA. Fine needle aspiration cytology of the thyroid, 1980-1986. *Acta Cytol* 1987; 31(5): 587-90
12. Jayaram G Fine needle aspiration cytologic study of the solitary thyroid nodule. Profile of 308 cases with histologic correlation. *Acta cytol* 1985;29(6):967-73
13. Solanki Piyush K, et al. Fine needle aspiration cytology as a Diagnostic procedure in head and neck Swellings. *National journal of community medicine*, 2012; 3(3): 433-436.
14. Kumara S, Chowdhury N. Accuracy, limitations and pitfalls in the diagnosis of soft tissue tumours by fine needle aspiration cytology. *Indian J. Pathol Microbiol* 2007; 50(1): 42-45.